Exemption No. 6468

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
RENTON, WASHINGTON 98055-4056

In the matter of the petition of

Learjet Incorporated **Regulatory Docket No. 28544**

for exemption from § 25.783(h) of the Federal Aviation Regulations

PARTIAL GRANT OF EXEMPTION

By letter dated April 8, 1996, Mr. William W. Greer, Vice President for Engineering and Quality Assurance, Learjet Inc., One Learjet Way, Wichita, KS 67277-7707, petitioned for exemption from the passenger entry door emergency exit requirements of § 25.783(h) for the Lear 45 airplane.

Affected Sections of the FAR:

Section 25.783(h) requires that each passenger entry door in the side of the fuselage must qualify as a Type A, Type I, or Type II passenger emergency exit and must meet the requirements of §§ 25.807 through 25.813 that apply to that type of passenger emergency exit.

Related Sections of the FAR:

Section 25.807, in pertinent part, defines the minimum sizes and other attributes of the various emergency exit Types, prescribes ditching exit requirements, and establishes the minimum acceptable emergency exit configurations for given passenger occupancies.

ANM-96-020-E

Section 25.809 prescribes certain general attributes that each Type of emergency exit must have, including means of opening and provisions against jamming.

Section 25.811 requires, in pertinent part, emergency exits to be marked, their locations identified, and their means of operation displayed.

Section 25.812 requires an emergency lighting system of certain attributes.

Section 25.813 prescribes the access that is required to Types of emergency exits.

The petitioner's supportive information is as follows:

"In accordance with § 11.25, Learjet Inc., hereby petitions the Federal Aviation Administration (FAA) for exemption from § 25.783(h) as amended by Amendment 25-72. Our petition addresses the passenger entry door requirements for the Learjet Model 45 aircraft."

"Learjet requests, in accordance with § 11.27(j), that this request be considered without normal publication and comment procedures in the Federal Register. The original request for an FAA response on this subject was submitted to the FAA on January 31, 1995, in the form of a request for an Equivalent Level of Safety Finding. Recently, however, a petition for exemption was determined as the more appropriate course of action. Since resolution of this item has been pending for over a year, any delay in acting upon it now would be detrimental to Learjet's interest in finalizing a design and completing the timely certification of the Model 45."

"Section 25.783(h), as amended by Amendment 25-72, states that, 'Each passenger entry door in the side of the fuselage must qualify as a Type A, Type I, or Type II passenger emergency exit and must meet the requirements of §§ 25.807 through 25.813 that apply to that type of passenger emergency exit.'"

"Learjet requests exemption from § 25.783(h) for the Learjet Model 45, serial numbers 45-001 and on, because the Model 45 entry door design includes provisions for satisfactory emergency evacuation even though it does not meet all of the requirements of a Type A, Type I, or Type II emergency exit.

"For the Model 45, like all previous Learjets, the passenger entry door is a two-piece, clamshell door. For normal entry and exit, opening the door is a two-step procedure. First, the upper half of the door is opened by turning a single handle to its unlatched

position and pushing the door out and up to its uplocked position (aided by gas springs). Next, the lower half of the door, which contains two integral steps and one flip-over step, is opened by turning a handle and releasing a secondary latch. The weight of the door will drop it open (dampened by gas springs) and automatically deploy the flip-over step.

"The passenger entry door also functions as an emergency exit. However, only the upper half of the door (30 in. wide x 36 in. high) is used as the emergency exit. The door contains all of the required opening means, markings, and placards, and will comply with the emergency lighting requirements of § 25.812. This design provides an adequate means of safely and rapidly evacuating the aircraft in the event of an emergency.

"The following information is in support of this request:

"1. The means to operate the emergency exit is simple and obvious. As stated above, the upper half of the entry door is opened by turning a single handle in the direction of a conspicuous arrow to the open position and pushing the door out and up to its fully uplocked position (assisted by gas springs).

"2. The larger the diameter of an airplane's fuselage, the higher the cabin floor is from the bottom of the fuselage. The floor of a typical, small business jet, including the Model 45, is close to the bottom of the fuselage. Therefore, the bottom of a floor-level door would be close to the ground and other objects on the ground in the event of a gear-up landing or in the case of collapse of the gear in a crash landing. Fuselage damage near the bottom of the floor-level door, or damage to the bottom of the door itself, may prevent the door's opening. A split-type door can have an advantage in cases like this if the fuselage or bottom of the door is damaged. The upper half of the split-type door would be less likely to jam from fuselage or lower door damage. The requirement that the main entry door qualify as a floor level exit may detract from the overall suitability of the exit in the case of small-fuselage airplanes such as the Model 45. Exemption from that requirement would not detract from the evacuation capability when other suitable evacuation means are provided.

"3. The emergency exit (the upper half of the entry door) is located above the waterline calculated in ditching analyses. This means that the same exit and the same operating procedures can be used in land or in water evacuations, without the need for additional barriers or devices as is the case for other exit designs on similar size aircraft. Also, even though the exit door opens outward, since it is above the waterline, there is no need to overcome the force of water on the door to open it.

"4. The integral steps, with the lower half of the door closed, provide a large, flat, platform which will aid the occupants in stepping up to the exit opening.

"5. The door is wider than Type II or Type III minimum width requirements, which makes egress easier for a greater percentage of the population.

"6. The distance from the lower edge of the exit to the ground with the landing gear extended is well below the 6-ft. limit, above which assist means are required.

"7. The emergency exit qualifies as a Type III emergency exit. The area of the exit opening is, in fact, 150 percent greater than the Type III minimum size requirement, and is even 123 percent greater than the minimum requirement of a Type II exit.

"8. The maximum number of occupants to be type certificated for the Model 45 is twelve (two crew plus ten passengers). The Model 45 exit will be required to facilitate the evacuation of only twelve persons in the worse case, which is if all twelve occupants exit through this, the left-hand emergency exit. Section 25.807 allows, for example, for 179-passenger airplanes, two Type I exits and two Type II exits for each side of the fuselage. In emergency evacuation demonstrations per Appendix J of part 25, only 50 percent of the required exits in the side of the fuselage may be used, so that means, if it is assumed that the 179 passengers are divided evenly among the four exits, that 44 people would use each Type III exit, the size requirements of which are 20 in. x 36 in. - smaller than the Model 45 exit, yet allowed to accommodate nearly four times the number of evacuees! There can be no doubt that the exit proposed for the Model 45 is satisfactory.

"9. Numerous evacuation demonstrations conducted over the past 30 years on various Learjet models with similar emergency exits have verified that the maximum number of occupants (10 passengers and 2 crew) can be evacuated through the upper half of the entry door within the 90-second time period specified in § 25.803 as amended by Amendment 25-72.

"10. This exit design concept is the same as that used on every other model in the Learjet family of aircraft. This provides commonality in operation of the exit for all Learjets, which is a plus in the operations of customers with more than one model of Learjet. Commonality, in both design and operation.

"11. The service history of the Learjet fleet (currently at 1,800 aircraft with over nine

million flight hours) has verified that the aircraft can be evacuated in actual emergency conditions utilizing the exits provided, which are similar to those of the Model 45. There are no recorded instances of unsuccessful attempts to evacuate the aircraft following minor emergency landings, and in fact, the same is true in a number of other cases which could be categorized as more severe than minor. Since 1963, there have been at least twenty-six accidents which involved successful evacuations of the surviving occupants without any documented cases of failure of the emergency exit to fulfill its intended function when the exit was used properly.

"12. Part 25 as amended by Amendment 25-15 was not part of the certification basis of any prior Learjet model. So the entry door was not required to qualify as a Type A, Type I, or Type II emergency exit. The satisfactory record of the upper half of the entry door in its function as an emergency exit was not negated by the amendment to the rule. In other words, the fact that the rule was amended did not suddenly render the existing exits unsafe. Therefore, an exemption from the new rule for the proven design incorporated in the Model 45 will not adversely affect safety.

"Granting of the exemption is in the public interest because it will:

". Not adversely affect flight safety, as described above.

". Allow incorporation of a proven design concept, common to the existing Learjet fleet. Commonality is generally regarded by safety experts as a positive factor for the flying public.

". Eliminate the need to design and produce a different door, thereby contributing to containing design and development costs, and to a less expensive, more salable product.

". By containing costs, improve the potential for domestic and foreign sales. Increased foreign sales contribute to a favorable U.S. balance of trade."

A summary of the Learjet, Inc., petition was published in the Federal Register on April 30, 1996 (61 FR 19112). No comments were received.

The FAA's analysis/summary is as follows:

All Learjet models previous to the currently proposed Lear 45, as well as the Lear 45, incorporate the non-plug clamshell entry door (an upper section opening upward and outward, and a lower section with integral steps opening outward and downward). The certification bases of all of these models prior to the Lear 45 allowed the upper portion only of the clamshell door to be considered as the required, Type III emergency exit in accordance with the basic minimum emergency exit requirements of § 25.807(d), i.e., a 20" x 36" minimum opening with a 20" maximum step-up. The corresponding emergency lighting, placarding, marking, operating controls, and intended evacuation procedures that were provided on all models prior to the Lear 45 were all appropriate to Type III emergency exits.

The certification basis of the Lear 45, however, is part 25 as amended by Amendments 25-1 through 25-75. Inclusive in this is the requirement, which currently appears in § 25.783(h), that each passenger entry door in the side of the fuselage must qualify as a Type A, Type I, or Type II passenger emergency exit and must meet the requirements of §§ 25.807 through 25.813 that apply to that type of passenger emergency exit. The proposal for this requirement was published in Notice 66-26, in 1966, in response to studies which showed that during emergency evacuation demonstrations or during actual emergency evacuations, there was a natural tendency for passengers to try to leave by the same route they entered the airplane. The stated intent of the proposal was to require that each passenger door qualify as an emergency exit *whether or not it is a required emergency exit* (emphasis added). Accordingly, the FAA considers it very clear that the requirements of § 25.783(h) are to be imposed irrespective of any compliance with the emergency exits vs. occupancy criteria of § 25.807(d). This requirement from which exemption is sought was adopted by Amendment 25-15, almost thirty years ago (effective October 24, 1967). Part 121 was also amended at that time to require all floor level exits, which would include entry doors, to comply with emergency exit requirements.

It was not documented to what extent the subject rule was prompted by any actual cases in service of entry doors that did not comply with emergency exit requirements. But it is reasonably certain at this point that the FAA was not asked then to also address any case where passengers, in attempting to egress through the same door they entered, encountered instead a completely different exit configuration from the one through which they entered. The petitioner is currently proposing just such an installation for the Lear 45: The full-height floor level opening of the entry doorway that the passenger passes through upon entry would effectively no longer exist for an emergency evacuation--the passenger would instead be confronted with a Type III emergency exit hatch with a 20-inch high sill which must be crawled over to egress. The FAA considers this proposal to be one which can only serve to unnecessarily challenge the perceptual and physical abilities of passengers in a time of great stress, and would likely contribute to delays in evacuation. Consequently, the FAA determines this proposal to be clearly inimical to the intent behind Amendment 25-15.

The petitioner's comments with regard to the value of retaining the current design in order to benefit from fleet commonality with older Lear models are well taken, as far as they went. The FAA considers instead, however, that the value is in forming a commonality with the rest of the world fleet of airplanes that are in compliance with current requirements. The petitioner's comments, without substantiation, with regard to service history are also well taken. This, as well as some consideration for a degree of confusion relative to defining certification requirements sufficiently early in the Lear 45 development program, have been considered as some justification in establishing an appropriate, time-limited relief from the subject requirements.

The FAA is sympathetic to the petitioner's arguments in favor of a clamshell door configuration for this size of aircraft. In cases of lower fuselage crush during a crash landing on land, or in a ditching, the capability to independently operate only the upper portion of the exit clearly has merit. The FAA is therefore not seeking to discourage this configuration, per se, but considers it necessary to mandate the minimum degree of reconfiguration or redesign necessary to satisfy all concerns. Toward this end, considering that the exit opening is already floor level and that it already complies with Type II exit size requirements of § 25.807(a)(2), i.e., 20 in. x 44 in., when both upper and lower portions of the clamshell door are open, the Lear 45 is already in a considerable degree of compliance with the requirements of § 25.783(h) from which exemption is sought--except that the petitioner has not equipped this exit with certain defined secondary characteristics and features required of Type II exits (applicable parts of §§ 25.807 through 25.813 pertaining to Type II exits). The FAA estimates that only relatively minimal reconfigurations should be necessary to satisfy most of the several remaining aspects of § 25.783(h) compliance. A major exception concerns the operating controls, discussed below.

In the context of now considering the two-part clamshell entry door as the required Type II emergency exit, the door is noted to be provided with two separate operating handles (one for each portion of the door, with the one for the lower portion becoming visible and usable only upon opening the upper portion), in violation of the intent of § 25.783(b) which requires that the means of opening must be simple and obvious. As expressed in Advisory Circular (AC) 25.783-1, passenger emergency exits should require no more than one simple manual handle operation to unlock and open an exit. Similarly, the means of opening the lower portion of the door externally, as required for compliance with § 25.783(b), is not easily visible from the outside (the handle is flush-located on top of the lower door portion). In addition, opening the lower portion of the door requires that a secondary latch be released. Retention of these features is not acceptable. In order to comply with certification requirements, a single handle, single motion means of opening both portions of the clamshell Type II entry door shall be provided, both inside and outside the airplane, with suitable means provided to address a jammed lower portion or a ditching situation.

After evaluating all aspects of this petition for exemption from requirements intended to facilitate the safe emergency evacuation of aircraft, the FAA has determined, on balance, that the petitioner has not convincingly shown (as required by § 11.25(b)(5)) either that the proposals would not adversely affect safety or that they would provide a level of safety equal to that provided by the rule from which exemption is sought. Accordingly, the petitioner's request for a full grant of exemption from emergency exit requirements for entry doors must be denied. However, the justifications noted above for some measure of relief would suggest that the petitioner be granted an interval of time in which to fully comply with certification requirements

In consideration of the foregoing, I find that a partial grant of exemption is in the public interest, and should not have a significant effect on the level of safety provided by the regulations. Therefore, pursuant to the authority contained in §§ 313(a) and 601(c) of the Federal Aviation Act of 1958, delegated to me by the Administrator (14 CFR 11.53), the petition of Learjet Inc., for an exemption from the passenger entry door emergency exit requirements of § 25.783(h) on the Lear 45 airplane, is granted until June 15, 1998, only, on condition that Learjet immediately begin the developments necessary to provide an entry door for the Lear 45 that is fully compliant with the letter and intent of the certification requirements discussed herein and listed below for convenience. After that date, this exemption expires, and all new Lear 45 airplanes delivered after that date must comply with these requirements. Similarly, by that date, all owners and operators of any previously delivered Lear 45 airplanes must have been afforded sufficient opportunity and provided the means to have completed retrofit of their aircraft, in order that their Certificates of Airworthiness may remain valid.

1. The door operating controls, both internally and externally, shall be configured so that a single control, operated in a single motion, will actuate the opening of both the upper and lower portions of the clamshell door, in accordance with § 25.783(b) and AC 25.783-1 for the full-sized Type II emergency exit required.

2. In addressing the ditching requirements of § 25.807(e), any alternate exit operating provisions and instructions specific to ditching only shall be provided in accordance with the requirements of § 25.811(e).

3. The exterior marking requirements of § 25.811(f) shall be addressed for the entire exit provided, i.e., the exit band shall encompass both the upper and lower portions of the Type II doorway opening.

4. The interior marking and illumination requirements of § 25.811(e) pertinent to Type II emergency exits shall be provided.

5. A passageway shall be provided between the main aisle and the exit in accordance with the requirements of § 25.813(a) pertinent to Type II emergency exits.

6. Passageway illumination shall be provided in accordance with the emergency lighting requirements of § 25.812(d) pertinent to Type II emergency exits.

Issued in Renton, Washington, on June 26, 1996.

/s/
Stewart R. Miller
Acting Assistant Manager
Transport Airplane Directorate,
Aircraft Certification Service